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1. Vision

This Future Architecture Vision provides a view of what is technologically possible on an implementation-horizon somewhat beyond the seven-year implementation-horizon established for the Target Architecture Vision. The EA Future Vision attempts to aggressively exploit new technology and it makes broad assumptions about changing business paradigms.

The Future Vision does not always address vetted business needs. It attempts to inform VA business leadership about "what will be technically possible" and to stimulate discussion, into which of these technical innovations business leadership may find to be useful and appropriate for VA. From that discussion, the next generation of the Target Architecture Vision will evolve.

1.1. The Changing VA Business Environment

Several factors are combining to create radical change in the composition and service-priorities of VA's client populations.

In the past VA provided service, for the most part, to separated, former active duty, uniformed service members. Many of these individuals would enter into service between ages eighteen and twenty-one and would be discharged before age thirty. The services provided by VA, prior to military separation were, somewhat, limited to home loan guarantees and education benefits. Once separated, these individuals rarely re-entered active military service. At that time, Reserve and National Guard were not eligible for VA benefits.

Today, 55% of the United States' deployed military force is composed of activated Reserve and National Guard and, with changes in legislation; these individuals are now eligible for the full range of VA benefits. Unlike their Regular, Active Duty counterparts, Reserve and National Guard members are activated for one or two years at a time, they then return to civilian life and can expect to be reactivated several additional times in the course of their career. This creates a revolving door, with service members alternating between DoD and VA for benefits and health care delivery. National Guard and Reserve service members often stay longer in their military careers than do their active duty counterparts; they also tend to be older than Regular active duty personnel are, when first deployed. Reserve and National Guard personnel may also bring more complex medical histories into DoD upon entering active duty (including conditions that would preclude the enlistment of a new recruit), and they may return to reserve status with additional medical complexities. Additionally, during pre-deployment, older Reserve and National Guard members will sometimes receive injuries and fail to deploy, due to pre-existing medical conditions or due to insufficient physical conditioning. Today, 26% to 28% of Army Reserve and Army National Guard are over age 40.

Recent, combined efforts between DoD and VA to create a seamless transition between the

termination of DoD benefits and the initiation of VA benefits upon separation, have resulted in initiatives to pre-register and pre-process injured service members while they are on active duty. This practice reduces the time required for VA to make an eligibility determination after the service member's discharge status is determined. While this practice is currently in place only for injured service members within Military Medical Treatment Facilities, this practice may expand to include all DoD post-deployment centers. It that occurs, then all DoD service personnel would automatically be enrolled with VA upon separation from active duty; and VA's emphasis in delivery of enrollment services would shift from VA facilities to DoD facilities.

In some pilot programs, today, DoD and VA are providing specific medical services to members of each others patient populations, when facility proximity, and quality and economy of service recommend this practice. In some future scenarios, military service members would be enrolled with VA very early on in their military careers, perhaps at a routine administrative and orientation session during basic training. This would permit VA to keep the service member informed of benefit eligibility at various stages of his/her career.

These changes and innovations all serve to blur the distinction between serving, active duty military personnel and separated veterans. This changing military paradigm erodes the rational for maintaining separate, distinct personnel and medical recordkeeping systems for these populations.

1.2. Changing Expectations in Quality of Service

Today's recently discharged veteran is extremely comfortable with the internet, and the quality of service that it can provide, when properly managed. Internetworking is heavily integrated into DoD mission management and personnel administration, as well as personal life. Over time, more and more, Veterans and Service Members will expect an equivalent level of convenience when conducting business with VA. Veterans will expect to:

- Apply for specific benefits, on-line, from their home, on a 24x7 basis.
- Establish their identity and authenticate documents, with electronic signatures, with VA much as they do today within DoD.
- Review, comment, and correct their personal records without appearing at a VA office.
- Perform routine interactions with VA health care providers (such as the submission of results from self-administered tests, telephone-based medical consultations, and re-ordering medical prescriptions).

1.3. EA Future Vision

The EA Future Vision suggests strategic goals for a desired business end-state which extends beyond the seven-year Target Architecture implementation-horizon. The Future Vision addresses

implementation in the next eight to fifteen years. Unlike the initiatives identified within the Target Architecture, these suggested goals have not necessarily been vetted and adopted by VA's business leadership. They are presented to stimulate discussion around what may be done, from an EA perspective, to satisfy emerging service trends and to exploit emerging technology. Over the next year, OEAM will facilitate business leadership discussion of these topics, in order to develop a focused and supported consensus and an accompanying action plan, for the next EA publication.

Every business interaction between VA and its clients, employees and business affiliates will be available in self-service mode via the Web and via structured telephone applications, as well as other emerging media:

- VA will focus on veterans, employees and affiliates. Our service delivery must be customer focused, or "Vet-Centric";
- All Veteran, affiliate and employee interfaces with VA will be self-service enabled via the web and/or other relevant technologies;
- The individual's contact-experience with VA will be intuitive, simple, will minimize inefficiencies, and wasted effort. An activity conducted for one business line will be applied wherever it is pertinent, across VA; veterans will not have to provide the same information across different business lines and VA service locations;
- Registration with VA will be a "one time" event.
- Tele-medicine will be expanded as it becomes possible to authenticate a veteran across the internet with non-repudiation and location validation. Homebound veterans will be able to access more VA services and to obtain medical consultation without traveling to a VA facility.

 All Data and Applications will be shared, multi-use, and accessible:

- Eliminate single thread and boutique systems and processes, and instead share the data and information;
- VA will know what it has for data, will know how to get to it effectively, and will use it repeatedly and efficiently;
- VA will implement an Enterprise Data Layer in which all corporate data is centrally owned and managed and is available to all VA business applications through standard interfaces, thereby eliminating duplicate data and the majority of data reconciliation work. Data will be defined and controlled through communities of interest, which will also have responsibility for data acquisition and maintenance.

VA's Infrastructure will be self-healing, robust, transparent, and *always* available.

- VA's future infrastructure will focus upon Integrated Network Services and Regional Data Processing with integrated, standardized COOP capabilities, is the future. Additional redundancy and capacity will be acquired to meet the needs of contingency operations.

- VA's quality of service will be characterized by "5 Nines" and "6 Sigma", elegantly engineered and nationally harmonized - available and ubiquitous.
- Infrastructure, computing and networking capabilities must strive for "commodity status", emphasizing interchangeability and interoperability and optimal total cost of ownership.

VA's business processes and supporting IT infrastructure will be agile and will be capable of rapidly accommodating new program requirements legislated by Congress, directed by the White House, or mandated by the Courts.

- VA will focus its application development efforts upon its core competency business functions, producing high quality information systems to implement and support service delivery to veterans;
- VA will acquire common, Government-Department cross-cutting support applications from FEA LOB, FEA E-Government or COTS solutions wherever practical, in order to avoid expensive duplicate application development and maintenance.
- VA will develop sharable service component oriented applications in which common service components are defined and developed to satisfy similar requirements within multiple business lines; and VA will utilize government registries of developed sharable service components, where available, in lieu of custom in-house development.
- VA will implement an Enterprise Data Layer in which all corporate data is centrally owned and managed and is available to all VA business applications through standard interfaces, thereby eliminating duplicate data and the majority of data reconciliation work. Data will be defined and controlled through communities of interest that will also have responsibility for data acquisition and maintenance.

VA will work with its DoD, Coast Guard, NOAA, and Public Health Service business affiliates to institute a seamless transition between active uniformed service and veteran status, through which registration with VA will become an automatic consequence of joining a uniform service.

- VA will use out-reach training opportunities, integrated into military basic training and other indoctrination programs, to register service members at the beginning of their military careers, rendering it unnecessary for the veteran to register with VA years after leaving the military.
- Many VA benefits, available to uniformed, in-service personnel, such as life insurance and home-loan guarantees will become eminently more accessible.

1.4. Exploiting VA's Technology Architecture Possibilities

VA's Target Architecture, IT Project Portfolio, and EA Portfolio Recommendations will focus new system development to address these emerging future goals and client needs. The following emerging technologies will contribute significantly to achieving this future vision.

1.4.1. Exploiting VA's Three-Tiered Application Development Standard

VA's current, open-standards-based, three-tiered architecture is well positioned to meet the challenges of these emerging business requirements. VA's three-tiered approach provides workload distribution and differentiation across a data-tier, an application-tier, and a presentation-tier. This approach, combined with VA's emerging infrastructure standardization, can be aggressively exploited to improve service quality and efficiency and to provide VA's business lines with unprecedented flexibility in service delivery. Furthermore, the isolation of business rule processing from data management in the application tier and data tier, respectively, facilitates the development of the Enterprise Data Layer, described below.

1.4.1.1. Enterprise Data Layer - Data Tier Architecture

The data management tier of the architecture will be developed into an interoperable, application-independent, shared, data resource, the components of which would be accessible to applications through appropriate standard interfaces. In cases where this data has value across departments, such as service history, identification and health data between DoD and VA, the data-store should be a shared entity between those departments.

The shared-data approach:
- Eliminates duplication of data as well as duplication of data collection and reconciliation efforts and the corresponding costs.
- Creates a high-integrity data asset with enduring value beyond the limited useful life of the applications that attach to data.
- Avoids the interoperability issues that result from stove-piped, application-specific data specifications.
- Eliminates all of the difficulties that result from shipping service member records back and forth between DoD and VA in the case of reactivated Reserve and National Guard Personnel.
- Results in greater convenience to veterans and service members who will no longer be required to repetitively provide the same information when interacting with different business entities across VA.

The cost of this investment is in the comprehensive analysis and reconciliation of all VA business data requirements, the creation, and enforcement of a centralized data policy, across all business lines, and the eventual data conversion and the adaptation of applications to utilize the common data store.

Accomplishing this objective begins with:
- A top-down identification and classification of VA data collections, their counterpart DoD data collections, and their application dependencies.
- Detailed bottom-up reconciliations of the data definitions and uses of each

data-collection-subset; in preparation for the
- Conversion of the data subset into a sharable data store, in conjunction with conversion of the data store's dependent applications.

In a vast enterprise, such as VA, this last step must be performed and deployed incrementally.

1.4.1.2. Application Tier Architecture

The application tier specifically calls for application development using Java open standard tools and methodologies, resulting in a high level of platform independence. Since VA's presentation architecture stresses thin-client, browser-based development, the application tier must support the preponderance of application business logic implementation. Concentration of business logic at the application tier also facilitates the development of sharable service components, across applications.

As implementation of this approach continues, in conjunction with an Enterprise Data Layer, VA and its business-partner departments will find it possible to identify and develop common application process components that:

- Employ the same or similar business rules.
- Can be adapted, in a component-based architecture, across all departments, sharing that enterprise data.
- Solve the same processing objective for each respective business line.

Through this approach, and predicated upon the use of shared data assets, VA and its business partners will begin to achieve a shared, inter-department component-based architecture and will provide higher levels of consistent service delivery at lower development cost.

1.4.1.3. Presentation Tier Architecture

VA's current Presentation Tier standard calls for a thin-client (web-browser) based application presentation. This provides extreme flexibility in reaching a wide internet audience with very little limitation in client hardware and software configuration selection, and in client networking resource selection. As open-source browser-products gain market-share, VA's policy of avoiding dependency upon proprietary web-protocols is also validated.

By extending this architecture vision to include the selective use of signed-Java-applets (in the near future), veterans will be able to obtain secure authentication and non-repudiation credentials through a VA-issued smart card (or, alternatively, they will be able to convert their DoD-issued smart card for VA use). Once positive authentication is established, veterans should be able to correct their VA records or apply for specific services on-line, from anywhere and on a 7x24 basis.

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VA and its business partner departments will share inter-department data resources in order to facilitate the bi-directional movement of Reserve and National Guard personnel in and out of active duty status and to provide a seamless and efficient experience for retiring and discharged service members, returning to civilian life.

1.4.2. Exploiting IPV6 Networking

VA's Transformation to IPV6 will provide complete IPV6-compatibility across the VA Intranet and onto the internet before September 2008. However, the practical utilization of IPV6's increased application functionality will be delayed until MS Windows Server and Client operating environments can support this technology, and until a substantial percentage of VA's client base has upgraded their home and office computing environments to that IPV6 compatible technology.

Once in place, IPV6 expanded addressing provides the ability to establish positive veteran authentication with non-repudiation to the application level, as well as the ability to identify client location information. This will provide opportunities for expanded telemedicine with HIPAA compliant privacy and security, directly to the veteran at home.

1.4.3. Exploiting RFID-Tagging Technology

Radio Frequency Identification Tagging (RFID-Tagging) allows an unattached reader device to read an electronic label (either active or passive) that is attached to an article that is being controlled.

Today, this technology is being used in the VA's "Smart Prescription" program, which allows vision impaired medical care recipients to use a voice responding RFID-Tag reader to read and "speak" the information on their prescription bottles. This is an important advance in patient safety and in expanding the limits of telemedicine.

In the future, this technology may permit VA to:
- Manage inventories of perishable materials, by facilitating a first-in first-out usage program.
- Maintain tight controls over the acquisition, storage, and distribution of controlled substances.
- Track the location of mobile equipment such as high-priced test equipment, and microscopes.
- Enforce HIPAA accountability standards on hard-copy medical information such as x-ray photographs, EKG-printouts, etc.

1.5. Future Vision Summary

In a few years, the veteran or service member should be able to maintain one combined record

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for all administrative and health management purposes. That record should be used across all of the uniformed services and across VA. The actual location of that record should be immaterial to both the veteran and to the service provider. It could reside within a DoD or VA record center or perhaps within the national archive and it would be accessed by trusted applications within the uniformed services or within VA. High levels of data integrity and accuracy will be achievable when one record is used for all purposes, and high levels of customer satisfaction will result from not requiring service members and veterans to repetitively provide the same information on numerous occasions.